WHAT IS CLAIMED IS:

1. A Factor IX peptide comprising at least one moiety having the formula:

$$COOH$$
 $COOH$
 $COOH$
 $COOH$
 $COOH$
 OH

3 wherein

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D is a member selected from -OH and R¹-L-HN-;

G is a member selected from R^1 -L- and -C(O)(C₁-C₆)alkyl;

R¹ is a moiety comprising a member selected a straight-chain or branched poly(ethylene glycol) residue; and

L is a linker which is a member selected from a bond, substituted or unsubstituted alkyl and substituted or unsubstituted heteroalkyl,

such that when D is OH, G is R^1 -L-, and when G is $-C(O)(C_1-C_6)$ alkyl, D is R^1 -L-NH-.

2. The Factor IX peptide according to claim 1, wherein L-R¹ has the formula:

$$R^1$$
— HN
 a
 O

3 wherein

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a is an integer from 0 to 20.

1 3. The Factor IX peptide according to claim 1, wherein R¹ has a structure that is a

2 member selected from:

- e and f are integers independently selected from 1 to 2500; and
- q is an integer from 0 to 20.
- 1 4. The Factor IX peptide according to claim 1, wherein R¹ has a structure that is a
- 2 member selected from:

$$\label{eq:ch2} \begin{picture}(0,0) \put(0,0) \put(0,0)$$

$$\label{eq:harmonic} \begin{cases} \text{NHC(O)CH}_2\text{CH}_2\text{(OCH}_2\text{CH}_2\text{)}_e\text{OCH}_3} \\ \text{NHC(O)CH}_2\text{CH}_2\text{(OCH}_2\text{CH}_2\text{)}_f\text{OCH}_3} \\ \text{NHC(O)CH}_2\text{CH}_2\text{(OCH}_2\text{CH}_2\text{)}_f\text{OCH}_3} \end{cases} \\ = \begin{cases} \text{NHC(O)CH}_2\text{CH}_2\text{(OCH}_2\text{CH}_2\text{)}_f\text{OCH}_3} \\ \text{NHC(O)CH}_2\text{CH}_2\text{(OCH}_2\text{CH}_2\text{)}_f\text{OCH}_3} \\ \text{NHC(O)CH}_2\text{CH}_2\text{(OCH}_2\text{CH}_2\text{)}_f\text{OCH}_3} \\ \end{cases}$$

WHC(O)CH₂CH₂(OCH₂CH₂)_fOCH₃

$$\label{eq:harmonic} \begin{picture}(0,0) \put(0,0) \put($$

4 wherein

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e, f and f' are integers independently selected from 1 to 2500; and q and q' are integers independently selected from 1 to 20.

- 1 5. The Factor IX peptide according to claim 1, wherein R¹ has a structure that is a
- 2 member selected from:

$$\label{eq:ch2} \begin{tabular}{lll} & & & & & \\ & & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & &$$

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- e, f and f' are integers independently selected from 1 to 2500; and
- q, q' and q"are integers independently selected from 1 to 20.
- 1 6. The Factor IX peptide according to claim 1 wherein R¹ has a structure that is a
- 2 member selected from:

4 wherein

- e and f are integers independently selected from 1 to 2500.
- 1 7. The Factor IX peptide according to claim 1, wherein said moiety has the formula:

1 8. The Factor IX peptide according to claim 1, wherein said moiety has the formula:

1 9. The Factor IX peptide according to claim 1, wherein said moiety has the formula:

3 wherein

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- 4 AA is an amino acid residue of said peptide.
- 1 10. The Factor IX peptide according to claim 9, wherein said amino acid residue is a
- 2 member selected from serine or threonine.
- 1 11. The Factor IX peptide according to claim 1, wherein said peptide has the amino acid
- 2 sequence of SEQ. ID. NO:1.
- 1 12. The Factor IX peptide according to claim 11, wherein said amino acid residue is
- 2 serine at position 61 of SEQ. ID. NO:1.
- 1 13. The Factor IX peptide according to claim 1, wherein said moiety has the formula:

$$\xi \xrightarrow{\text{AA}} (\text{Fuc})_{i} \\ \xi \xrightarrow{\text{AA}} (\text{GlcNAc-GlcNAc-Man})_{i} \\ \text{GlcNAc-GlcNAc-Man} \\ \text{Man} \underbrace{\left[(\text{GlcNAc-(Gal)}_{a})_{e} - (\text{Sia})_{j} - (\text{R)}_{v} \right]_{r}}_{\left[(\text{GlcNAc-(Gal)}_{b})_{f} - (\text{Sia})_{l} - (\text{R)}_{w} \right]_{s}} \\ \text{Man} \underbrace{\left[(\text{GlcNAc-(Gal)}_{d})_{g} - (\text{Sia})_{l} - (\text{R)}_{v} \right]_{t}}_{\left[(\text{GlcNAc-(Gal)}_{d})_{h} - (\text{Sia})_{m} - (\text{R})_{y} \right]_{u}}_{q}$$

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a, b, c, d, i, r, s, t, and u are integers independently selected from 0 and 1;

5 q is 1;

wherein

e, f, g, and h are members independently selected from the integers from 0 to 6;

j, k, l, and m are members independently selected from the integers from 0 and 100;

v, w, x, and y are independently selected from 0 and 1, and least one of v, w, x and y

is 1;

AA is an amino acid residue of said Factor IX peptide;

Sia-(R) has the formula:

wherein

D is a member selected from -OH and R¹-L-HN-;

G is a member selected from R^1 -L- and -C(O)(C₁-C₆)alkyl;

R¹ is a moiety comprising a member selected a straight-chain or branched

poly(ethylene glycol) residue; and

L is a linker which is a member selected from a bond, substituted or

unsubstituted alkyl and substituted or unsubstituted heteroalkyl,

such that when D is OH, G is R^1 -L-, and when G is $-C(O)(C_1-C_6)$ alkyl, D is R^1 -L-NH-.

- 1 14. The Factor IX peptide according to claim 7, wherein said glycosyl residue is attached
- 2 to a member selected from Asn 157, Asn 167 and combinations thereof.
- 1 15. A pharmaceutical formulation comprising the Factor IX according to claim 1 and a
- 2 pharmaceutically acceptable carrier.
- 1 16. A method of stimulating blood coagulation in a mammal, said method comprising
- 2 administering to said mammal said Factor IX peptide according to claim 1.
- 1 17. A method of treating hemophilia in a subject, said method comprising administering
- 2 to said subject said Factor IX peptide according to claim 1.
- 1 18. A method of making a Factor IX peptide conjugate comprising the moiety:

- D is a member selected from -OH and R¹-L-HN-;
- G is a member selected from R^1 -L- and -C(O)(C₁-C₆)alkyl;
- R¹ is a moiety comprising a member selected a straight-chain or branched poly(ethylene glycol) residue; and
- L is a linker which is a member selected from a bond, substituted or unsubstituted alkyl and substituted or unsubstituted heteroalkyl,
- such that when D is OH, G is R^1 -L-, and when G is $-C(O)(C_1-C_6)$ alkyl, D is R^1 -L-NH-,
- said method comprising:
- (a) contacting a substrate Factor IX peptide with a PEG-sialic acid donor moiety
 having the formula:

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and an enzyme that transfers said PEG-sialic acid onto an amino acid or 16 glycosyl residue of said Factor IX peptide, under conditions appropriate for 17 the transfer. 18

The method according to claim 18, wherein L-R¹ has the formula: **19.** 1

$$R^1$$
— HN
 a
 O
 S

2

wherein 3

a is an integer from 0 to 20. 4

The method according to claim 18, wherein R¹ has a structure that is a member **20.**

selected from:

3

wherein 4

e and f are integers independently selected from 1 to 2500; and 5

q is an integer from 0 to 20. 6

The method according to claim 18, wherein R¹ has a structure that is a member 21.

selected from: 2

3

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e, f and f' are integers independently selected from 1 to 2500; and

q and q' are integers independently selected from 1 to 20.

- 1 22. The method according to claim 18, wherein R¹ has a structure that is a member
- 2 selected from:

3

e, f and f' are integers independently selected from 1 to 2500; and

q, q' and q"are integers independently selected from 1 to 20.

1 23. The method according to claim 18 wherein R¹ has a structure that is a member

2 selected from:

$$\label{eq:coch2} \begin{array}{l} \xi - \text{C(O)CH}_2\text{CH}_2\text{(OCH}_2\text{CH}_2\text{)}_e\text{OCH}_3 \ ; and \end{array}$$

4 wherein

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e and f are integers independently selected from 1 to 2500.

24. The method according to claim 18, wherein said Factor IX peptide conjugate

2 comprises a moiety having the formula:

1 25. The method according to claim 18, wherein said Factor IX peptide conjugate

2 comprises a moiety having the formula:

1 26. The method according to claim 18, wherein said factor IX peptide conjugate

2 comprises a moiety having the formula:

4 wherein

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5 AA is an amino acid residue of said Factor IX peptide.

- 1 27. The method according to claim 26, wherein said amino acid residue is a member
- 2 selected from serine or threonine.
- 1 28. The method according to claim 18, wherein said factor IX substrate peptide has the
- 2 amino acid sequence of SEQ. ID. NO:1.
- 1 29. The Factor IX peptide according to claim 28, wherein said amino acid residue is
- 2 serine at position 61 of SEQ. ID. NO:1.
- 1 30. The method according to claim 18, wherein said Factor IX conjugate comprises a
- 2 glycosyl residue having the formula:

$$\begin{cases} -AA - \begin{pmatrix} (Fuc)_i \\ GlcNAc-GlcNAc-Man \\ \end{pmatrix} & \begin{pmatrix} [GlcNAc-(Gal)_a]_e - (Sia)_j - (R)_v \\ [GlcNAc-(Gal)_b]_f - (Sia)_k - (R)_w \\ \end{pmatrix}_s \\ & \begin{pmatrix} [GlcNAc-(Gal)_b]_f - (Sia)_l - (R)_x \\ \end{pmatrix}_t \\ & \begin{pmatrix} [GlcNAc-(Gal)_d]_h - (Sia)_m - (R)_y \\ \end{pmatrix}_u \end{pmatrix}_q \end{cases}$$

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₹}

a, b, c, d, i, r, s, t, and u are integers independently selected from 0 and 1; 5

q is 1; 6

e, f, g, and h are members independently selected from the integers from 0 to 6;

j, k, l, and m are members independently selected from the integers from 0 and 100;

v, w, x, and y are independently selected from 0 and 1, and at least one of v, w, x, and

10 y is 1;

AA is an amino acid residue of said Factor IX peptide; 11

12 Sia-(R) has the formula:

wherein 14

D is a member selected from -OH and R¹-L-HN-; 15

G is a member selected from R^1 -L- and -C(O)(C₁-C₆)alkyl; 16

R1 is a moiety comprising a member selected a straight-chain or branched 17

poly(ethylene glycol) residue; and 18

L is a linker which is a member selected from a bond, substituted or 19 20

unsubstituted alkyl and substituted or unsubstituted heteroalkyl,

such that when D is OH, G is R¹-L-, and when G is -C(O)(C1-C6)alkyl, D is 21

 R^1 -L-NH-. 22

- 1 31. The method according to claim 30, wherein said glycosyl residue is attached to a
- 2 member selected from Asn 157, Asn 167 and combinations thereof.
- 1 32. The method of claim 18, further comprising, prior to step (a):
- 2 (b) expressing said substrate Factor IX peptide in a suitable host cell.
- 1 33. The method of claim 32, wherein said host is selected from an insect cell and a
- 2 mammalian cell.